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## 1 Performance of Firefly RPC

M. Schroeder, M. Burrows

November 1989 **ACM SIGOPS Operating Systems Review , Proceedings of the twelfth ACM symposium on Operating systems principles,** Volume 23 Issue 5

Full text available:  pdf(1.03 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citings](#), [index terms](#)

In this paper, we report on the performance of the remote procedure call implementation for the Firefly multiprocessor and analyze the implementation to account precisely for all measured latency. From the analysis and measurements, we estimate how much faster RPC could be if certain improvements were made. The elapsed time for an inter-machine call to a remote procedure that accepts no arguments and produces no results is 2.66 milliseconds. The elapsed time for an RPC that has a ...

## 2 Compilers I: A performance analysis of the Berkeley UPC compiler

Parry Husbands, Costin Iancu, Katherine Yelick

June 2003 **Proceedings of the 17th annual international conference on Supercomputing**

Full text available:  pdf(137.75 KB)

[Additional Information: full citation, abstract, references, index terms](#)

Unified Parallel C (UPC) is a parallel language that uses a Single Program Multiple Data (SPMD) model of parallelism within a global address space. The global address space is used to simplify programming, especially on applications with irregular data structures that lead to fine-grained sharing between threads. Recent results have shown that the performance of UPC using a commercial compiler is comparable to that of MPI [7]. In this paper we describe a portable open source compiler for UPC. Ou ...

**Keywords:** UPC, global address space, parallel, performance

### 3 Implementing an efficient vector instruction set in a chip multi-processor using micro-threaded pipelines

Chris Jesshope

January 2001 **Australian Computer Science Communications , Proceedings of the 6th Australasian conference on Computer systems architecture,** Volume 23 Issue

Full text available:  pdf(911.26 KB)

**Additional Information:** full citation, abstract, references, citings

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This paper looks at a combination of two techniques, one of which, using a vector instruction set, has a long history dating back to pipelined vector supercomputers, such as the Cray 1 and its successors. The other technique, multi-threading, is also well understood. The novel approach proposed in this paper combines both vertical and horizontal micro-threading with vector instruction descriptors. It will be shown that a family of threads can represent a vector instruction with dependencies between ...

#### 4 Performance of a micro-threaded pipeline

Bing Luo, Chris Jesshope

January 2002 **Australian Computer Science Communications , Proceedings of the seventh Asia-Pacific conference on Computer systems architecture - Volume 6**, Volume 24 Issue 3

Full text available:  [pdf\(650.49 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)


The micro-threaded microprocessor is a chip multi-processor, which uses a multi-threaded approach, where the threads are obtained from within a single context and exploit both vector and instruction level parallelism (ILP). This approach employs vertical and horizontal transfer in a simple pipeline. The horizontal transfer is referred to as the normal scalar pipeline processing used in most microprocessors. Vertical transfer is a context switch, which allows the code to tolerate any latency from ...

**Keywords:** micro thread, micro-threaded pipeline, performance evaluation, scalar pipeline

#### 5 Multithreading and value prediction: Speculative lock elision: enabling highly concurrent multithreaded execution

Ravi Rajwar, James R. Goodman

December 2001 **Proceedings of the 34th annual ACM/IEEE international symposium on Microarchitecture**


Full text available:  [pdf\(1.37 MB\)](#)  Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)  
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Serialization of threads due to critical sections is a fundamental bottleneck to achieving high performance in multithreaded programs. Dynamically, such serialization may be unnecessary because these critical sections could have safely executed concurrently without locks. Current processors cannot fully exploit such parallelism because they do not have mechanisms to dynamically detect such false inter-thread dependences. We propose *Speculative Lock Elision (SLE)*, a novel micro-architectural ...

#### 6 Full-system timing-first simulation

Carl J. Mauer, Mark D. Hill, David A. Wood

June 2002 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 2002 ACM SIGMETRICS international conference on Measurement and modeling of computer systems**, Volume 30 Issue 1


Full text available:  [pdf\(87.83 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Computer system designers often evaluate future design alternatives with detailed simulators that strive for *functional fidelity* (to execute relevant workloads) and *performance fidelity* (to rank design alternatives). Trends toward multi-threaded architectures, more complex micro-architectures, and richer workloads, make authoring detailed simulators increasingly difficult. To manage simulator complexity, this paper advocates decoupled simulator organizations that separate functional ...

#### 7 Slice-processors: an implementation of operation-based prediction

Andreas Moshovos, Dionisios N. Pnevmatikatos, Amirali Baniasad

June 2001 **Proceedings of the 15th international conference on Supercomputing**


Full text available:  pdf(236.51 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We describe the Slice Processor micro-architecture that implements a generalized operation-based prefetching mechanism. Operation-based prefetchers predict the series of operations, or the computation slice that can be used to calculate forthcoming memory references. This is in contrast to outcome-based predictors that exploit regularities in the (address) outcome stream. Slice processors are a generalization of existing operation-based prefetching mechanisms such as stream buffers where the ...

8 [Thin locks: featherweight synchronization for Java](#)

David F. Bacon, Ravi Konuru, Chet Murthy, Mauricio Serrano

May 1998 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLAN 1998 conference on Programming language design and implementation**, Volume 33 Issue 5

Full text available:  pdf(1.30 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Language-supported synchronization is a source of serious performance problems in many Java programs. Even single-threaded applications may spend up to half their time performing useless synchronization due to the thread-safe nature of the Java libraries. We solve this performance problem with a new algorithm that allows lock and unlock operations to be performed with only a few machine instructions in the most common cases. Our locks only require a partial word per object, and were implemented ...

9 [Technical contributions: FORTH for microcomputers](#)

John S. James

October 1978 **ACM SIGPLAN Notices**, Volume 13 Issue 10


Full text available:  pdf(749.78 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Forth is a unique threaded language ideally suited for microcomputers. Programs are incredibly compact; e.g. in 5K to 6K bytes you can get the interactive Forth compiler, running stand-alone as its own operating system including I/O drivers and other run-time routines, plus an assembler written in Forth (in case you want to optimize time-critical programs), virtual memory software, and a text editor. Not only does all this fit into 5K to 6K bytes (of which 4K are written in Forth), but it runs i ...

10 [Experimental evaluation of the Hewlett-Parkard exemplar file system](#)

Rajesh Bordawekar, Steven Landherr, Don Capps, Mark Davis

December 1997 **ACM SIGMETRICS Performance Evaluation Review**, Volume 25 Issue 3

Full text available:  pdf(793.88 KB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

This article presents results from an experimental evaluation study of the HP Exemplar file system. Our experiments consist of simple micro-benchmarks that study the impact of various factors on the file system performance. These factors include I/O request/buffer sizes, vectored/non-vectored access patterns, read-ahead policies, multi-threaded (temporally irregular) requests, and architectural issues (cache parameters, NUMA behavior, etc.). Experimental results indicate that the Exemplar file s ...

11 [1998: Thin locks: featherweight Synchronization for Java](#)

David F. Bacon, Ravi Konuru, Chet Murthy, Mauricio J. Serrano

April 2004 **ACM SIGPLAN Notices**, Volume 39 Issue 4

Full text available:  pdf(1.94 MB) Additional Information: [full citation](#), [abstract](#), [references](#)

Language-supported synchronization is a source of serious performance problems in many Java programs. Even single-threaded applications may spend up to half their time performing useless synchronization due to the thread-safe nature of the Java libraries. We solve this performance problem with a new algorithm that allows lock and unlock operations

to be performed with only a few machine instructions in the most common cases. Our locks only require a partial word per object, and were implemented ...

## 12 High-level scheduling model and control synthesis for a broad range of design applications



Chih-Tung Chen, Kayhan Küçükçakar

November 1997 **Proceedings of the 1997 IEEE/ACM international conference on Computer-aided design**

Full text available: pdf(110.32 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

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This paper presents a versatile scheduling model and an efficient control synthesis methodology which enables architectural (high-level) design/synthesis systems to seamlessly support a broad range of architectural design applications from datapath-dominated digital signal processing (DSP) to micro-processors/controllers and control-dominated peripherals, utilizing multi-phase clocking schemes, multiple threading, data-dependent delays, pipelining, and combinations of the above. The work present ...

**Keywords:** control synthesis, scheduling model, multi-phase clocking, multi-threading, pipelining, relative scheduling, high-level synthesis, architectural synthesis, behavioral synthesis, architectural power optimization.

## 13 Building a high-performance communication layer over virtual interface architecture on Linux clusters



Jin-Soo Kim, Kangho Kim, Sung-In Jung

June 2001 **Proceedings of the 15th international conference on Supercomputing**

Full text available: pdf(367.79 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The Virtual Interface Architecture (VIA) is an industry standard user-level communication architecture for cluster or system area networks. The VIA provides a protected, directly-accessible interface to a network hardware, removing the operating system from the critical communication path. Although the VIA enables low-latency high-bandwidth communication, the application programming interface defined in the VIA specification lacks many high-level features.

In this paper, we develop a ...

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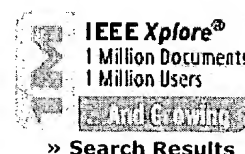
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*Matsuo, M.; Kondo, H.; Takata, Y.; Kobayashi, S.; Satoh, M.; Yoshida, T.; Saito, Y.; Hinata, J.-I.;*

Computer Design: VLSI in Computers and Processors, 1994. ICCD '94. Proceedings., IEEE International Conference on , 10-12 Oct. 1994  
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[Abstract] [PDF Full-Text (616 KB)] IEEE CNF

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*Erdogan, S.S.; Tunali, E.T.; Kuo, N.;*

Real-Time Applications, 1993., Proceedings of the IEEE Workshop on , 13-14 May 1993  
Pages:104 - 108

[Abstract] [PDF Full-Text (344 KB)] IEEE CNF

### 3 Controller synthesis for digital signal processors

*Owall, V.; Torkelson, M.;*

Circuits and Systems, 1991., IEEE International Symposium on , 11-14 June 1991  
Pages:2192 - 2195 vol.4

[Abstract] [PDF Full-Text (412 KB)] IEEE CNF

### 4 A configurable architecture for smart pixel research

*Cantin, J.F.; Beyette, F.R., Jr.;*

Electronic-Enhanced Optics, Optical Sensing in Semiconductor Manufacturing, Electro-Optics in Space, Broadband Optical Networks, 2000. Digest of the LEOS



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**5 A simulation methodology for software energy evaluation**

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VLSI Design, 1997. Proceedings., Tenth International Conference on , 4-7 Jan. 1997

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**6 A 50ns floating-point signal processor VLSI**

*Kaneko, T.; Yamauchi, H.; Iwata, A.;*

Acoustics, Speech, and Signal Processing, IEEE International Conference on ICASSP '86. , Volume: 11 , Apr 1986

Pages:401 - 404

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**7 A 55K transistor NMOS microprogrammable microprocessor**

*Grant, B.;*

Solid-State Circuits Conference. Digest of Technical Papers. 1983 IEEE International , Volume: XXVI , Feb 1983

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Real-Time Systems Symposium, 1992 , 2-4 Dec. 1992

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**9 Controller synthesis for application specific digital signal processors**

*Owall, V.; Torkelson, M.;*

ASIC Conference and Exhibit, 1991. Proceedings., Fourth Annual IEEE International , 23-27 Sept. 1991

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Circuits and Systems for Video Technology, IEEE Transactions on , Volume: 6 , Issue: 1 , Feb. 1996

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*Lau, W.; Jha, S.;*

Communications, 2003. ICC '03. IEEE International Conference on , Volume: 1 , 11-15 May 2003  
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**12 A gestural instruction learning robot using information infrastructure**

*Yamaguchi, T.; Kanazawa, N.; Akita, K.; Yoshihara, M.;*

Fuzzy Systems, 1995. International Joint Conference of the Fourth IEEE International Conference on Fuzzy Systems and The Second International Fuzzy Engineering Symposium., Proceedings of 1995 IEEE International Conference on , Volume: 5 , 20-24 March 1995

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**13 A hierarchical methodology for verifying microprogrammed microprocessors**

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